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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/562,578	12/27/2005	Yasuharu Onishi	Q92252	7872

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EXAMINER	
ROSENAU, DEREK JOHN	
ART UNIT	**PAPER NUMBER**
2837	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/562,578	ONISHI ET AL.	
	Examiner	Art Unit	
	Derek J. Rosenau	2837	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 April 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 3-8, 10, 11, and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang (US 6359370) in view of Bullock (US 4140936) and Chatigny et al. (US 5153859).

3. With respect to claim 1, Chang discloses a piezo-electric actuator (Fig 1) comprising: a piezo-electric element (item 106) having a piezo-electric body which is provided with at least two opposing surfaces (Fig 1), wherein the surfaces perform an expanding and contracting motion in accordance with a state of an electric field (column 3, lines 30-51); a constraint member (center of cruciform base 104) for constraining the piezo-electric element on at least one of the two sides, a supporting member (item 102) disposed around the constraint member, and a plurality of beam members (item 104) each having both ends that are fixed to the constraint member and the supporting member, respectively (Fig 1), wherein each beam member has a neutral axis for bending in a direction substantially parallel with the constrained surface (Fig 12 and column 6, lines 4-26), wherein the constraint member vibrates by vibration which is generated by constraining effect between the constraint member and the piezo-electric

element, and is amplified by the beam members (inherent to the structure), wherein said beam members are straight beams (Figures 1 and 2).

Chang does not disclose expressly that the supporting member does not extend below the constraint member or that the beam members are made of resin.

Bullock teaches a piezoelectric actuator (Fig 1), in which the supporting member (item 4) does not extend below the constraint member (item 3).

Chatigny et al. teaches a piezoelectric device in which the piezoelectric material is made of PVDF, which is made of a resin (column 3, lines 16-25). In combination with Chang, the piezoelectric stack and beam members of Chang would be made of the piezoelectric material taught by Chatigny et al. Therefore, the beam members would be made of a resin.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to combine the supporting member arrangement of Bullock and the piezoelectric resin of Chatigny et al. with the piezoelectric actuator of Chang for the benefit of reducing the amount of material required by eliminating the bottom portion of the supporting member and as it has been held that the selection of a material based on an art recognized suitability for an intended purpose is obvious (*In re Leshin*, 125 USPQ 416).

4. With respect to claim 3, the combination of Chang, Bullock, and Chatigny et al. discloses the piezoelectric actuator according to claim 1. Chang discloses that said constraint member has a base (center of cruciform base 104) for constraining said

piezo-electric element, and a plurality of arms (item 104) that extend from said base to constitute said beam members (Fig 1).

5. With respect to claim 4, the combination of Chang, Bullock, and Chatigny et al. discloses the piezoelectric actuator according to claim 1. Bullock discloses that said constraint member is a second piezoelectric element which differs in vibration direction from a first piezoelectric body (Fig 1).

6. With respect to claim 5, the combination of Chang, Bullock, and Chatigny et al. discloses the piezoelectric actuator according to claim 1. Chatigny et al. discloses that said piezo-electric element comprises a plurality of said piezo-electric bodies (items 30, 34, 38, and 42) and a plurality of electrode layers (items 32, 36, 40, 44, and 46) for applying an electric field to said piezo-electric bodies, wherein each piezo-electric body and each electrode layer is alternately laminated (Fig 2).

7. With respect to claim 6, the combination of Chang, Bullock, and Chatigny et al. discloses the piezoelectric actuator according to claim 1. Chang discloses that said piezoelectric element is provided with an insulating layer (item 104) on at least one of said two surfaces.

8. With respect to claim 7, the combination of Chang, Bullock, and Chatigny et al. discloses the piezoelectric actuator according to claim 1. Chang discloses that said piezo-electric element has a rectangular parallelepiped shape (Fig 1).

9. With respect to claim 8, the combination of Chang, Bullock, and Chatigny et al. discloses the piezoelectric actuator according to claim 1. Chang discloses a vibrating film (item 104) coupled to said piezo-electric actuator (Fig 1) for radiating sound through

vibration that is transmitted from said piezo-electric actuator. The movement of the piezo-electric element would generate “sound” in that it would generate pressure waves in the air surrounding it.

10. With respect to claims 10 and 11, the combination of Chang, Bullock, and Chatigny et al. discloses the piezo-electric actuator according to claims 1 and 8 respectively; therefore, Chang as modified by Bullock and Chatigny et al. discloses an electronic device comprising these actuators, as piezo-electric actuators are electronic devices.

11. With respect to claim 14, the combination of Chang, Bullock, and Chatigny et al. discloses the piezoelectric actuator according to claim 1. Bullock discloses that the constraint member (item 3) and the plurality of beam members (item 7 and 8) are made of metal or resin (column 2, lines 33-36).

12. With respect to claim 15, the combination of Chang, Bullock, and Chatigny et al. discloses the piezoelectric actuator according to claim 1. Both Chang et al. and Bullock disclose that the constraint member and the plurality of beam members are integrated (Fig 1 of Chang and Fig 1 of Bullock).

13. With respect to claim 16, the combination of Chang, Bullock, and Chatigny et al. discloses the piezoelectric actuator according to claim 1. Chang discloses that at least two beam members extend radially from the center of the constraint member (Fig 1).

14. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chang in view of Bullock, Chatigny et al., and Toki (US 5856956).

15. With respect to claim 9, the combination of Chang, Bullock, and Chatigny et al. discloses the piezoelectric actuator according to claim 8.

None of Chang, Bullock, or Chatigny et al. discloses expressly a vibration transmitting member sandwiched between said piezo-electric actuator and said vibrating film.

Toki teaches a piezo-electric speaker device that includes a vibration transmitting member (item 46) sandwiched between a piezo-electric actuator (item 47) and a vibrating film (item 42).

At the time of invention, it would have been obvious to a person of ordinary skill in the art to combine the vibration transmitting member of Toki with the piezo-electric actuators of Chang as modified by Bullock and Chatigny et al. for the benefit of crating a device in which the diaphragm itself need not be distorted (column 5, lines 53-58 of Toki).

16. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang in view of Bullock, Chatigny et al., and Ogura et al. (US 6453050).

17. With respect to claim 12, the combination of Chang, Bullock, and Chatigny et al. discloses the piezoelectric actuator according to claim 8.

None of Chang, Bullock, or Chatigny et al. discloses expressly a plurality of acoustic resonators which have resonance frequencies different from each other for smoothing frequency response of sound pressure.

Ogura et al. discloses an acoustic apparatus comprising a plurality of acoustic elements (figures 4 and 5) which have resonance frequencies different from each other for smoothing frequency response of sound pressure (column 11, lines 62-64).

At the time of invention, it would have been obvious to a person of ordinary skill in the art to combine the plurality of acoustic elements of Ogura et al. with the acoustic element of Chang as modified by Bullock and Chatigny et al. for the benefit of providing additional output sources and reducing the peak dip of the output (column 11, lines 62-64 of Ogura et al.).

18. With respect to claim 13, the combination of Chang, Bullock, Chatigny et al., and Ogura et al. discloses the piezoelectric actuator according to claim 12. As the acoustic apparatus is itself an electronic device, the combination of Chang, Bullock, Chatigny et al., and Ogura et al. disclose an electronic device including the acoustic apparatus according to claim 8.

Response to Arguments

19. Applicant's arguments filed 23 April 2009 have been fully considered but they are not persuasive. Applicant argues that the applied art does not disclose the feature of the beam members being made of a resin. However, this feature was not present in the claims at the time of the last office action. Chatigny et al. is now cited for its teaching of using PVDF as the piezoelectric material. By replacing the piezoelectric material in Chang with that taught by Chatigny, the result is that the cruciform base (beam members) would be made of PVDF, which itself is a resin material.

Conclusion

20. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Derek J. Rosenau whose telephone number is (571) 272-8932. The examiner can normally be reached on Monday thru Thursday 7:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Benson can be reached on (571) 272-2227. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Derek J Rosenau/
Examiner, Art Unit 2837

/Walter Benson/
Supervisory Patent Examiner, Art Unit 2837